SECONDARY HYPERTENSION

Prevalence

The prevalence of secondary hypertension is approximately 4-5% of all hypertensives. Because of its low prevalence, routine screening for secondary hypertension is not necessary. Renal causes constitute the largest group.

The percentage prevalence of various causes is shown in Table 16.[69,70]

Table 16: Prevalence of hypertension

Primary	
Essential hypertension	93-95%
Secondary	
Renal causes	
Parenchymal	2-3%
Renovascular	1-2%
Endocrine causes	0.3-1.0%
Pheochromocytoma	
Primary aldosteronism	
Cushing's syndrome	
Oral contraceptives	0.5%
Miscellaneous	0.5%

Presentation

The presence of following features warrants intensive investigations for secondary hypertension:

- Severe hypertension >180/110 mm Hg with onset at age ≤20 years or ≥50 years
- Resistant hypertension with significant end organ damage features
- Four P's of pheochromocytoma: pain (headache), palpitation, pallor and perspiration
- Polyuria, nocturia, proteinuria, or haematuria indicating renal disorder
- Absent peripheral pulses, brachiofemoral delay and abdominal or peripheral vessel bruits (coarctation of aorta, Takayasu's and atherosclerotic disease)
- Family history of polycystic renal disease and/or enlarged palpable kidneys
- Cushingoid features, multiple neurofibromas
- Elevation of plasma creatinine with use of ACE inhibitors

Important causes

A. Renoparenchymal[71,72]

- Chronic glomerulonephritis, chronic pyelonephritis, analgesic nephropathy, polycystic kidney disease, gout with renal failure, vasculitis and obstructive nephropathy
- Acute renal insults (acute glomerulonephritis, acute urinary tract obstruction and patients subjected to extra-corporeal shock wave lithotripsy)
- Post-renal transplant patients
- Drug-induced cyclosporine, steroids, and sustained use of erythropoietin

Investigations

Fresh urine examination for sediment and RBCs can be a pointer. Abdominal ultrasound for cyst, kidney size, echogenicity and obstruction may suggest a renal pathology. Renal biopsy in selected cases may be done to confirm the diagnosis.

B. Renovascular

- The most common cause of renovascular hypertension in India is Takayasu's syndrome (progressive aortoarteritis),[73] atherosclerotic renovascular disease is also being diagnosed more often now.
- The most common causes of renovascular disease in western population are atherosclerotic disease in 60% and fibromuscular dysplasia in 35%.
- Rare causes include embolic and tumor thrombus and extrinsic reasons.
- Takayasu's disease is a non-specific panarteritis affecting young women. Hypertension is mainly due to renal artery stenosis,[74] which can be unilateral or bilateral.
- Renovascular disease is much more common than renovascular hypertension (RVH).
- Atherosclerotic disease involves the proximal and fibromuscular dysplasia involves the distal renal artery.

Investigations

- An epigastric bruit is heard in 50-60% of patients with renovascular hypertension and 10% cases of essential hypertension. A diastolic renal bruit is more specific than systolic bruit.
- In patients with moderate degree of suspicion of renovascular hypertension, non-invasive tests are recommended initially.
- Wherever there is a high degree of suspicion, direct selective renal angiography is recommended.
- Captopril augmented renal scan is the non-invasive investigation of choice.It has a 75% sensitivity and specificity. Compounds used are ^{99}Tc - DTPA and ^{123}I - Hippuran. The stimulated plasma renin activity after captopril is > 12ng/ml/hour.
- Duplex sonography, CT angiography and MRI angiography are other good and non-invasive modalities. MRI angiography has higher sensitivity and specificity.
- Conventional angiography, though invasive, is the gold standard. Intra-arterial injection with digital subtraction angiography (DSA) may be used. Once the diagnosis is confirmed, renal angioplasty with stenting is the treatment of choice. Physicians should confirm anatomical narrowing versus functional disturbances before embarking upon planning any intervention. When angioplasty is not possible, surgical approach is recommended.

C. Endocrine causes

1. Pheochromocytoma

These chromaffin cell tumors are mostly adrenal. These may be extra-adrenal in 15% of the cases and bilateral adrenal in 10% of the cases. 10% of all cases are familial and 10% are malignant.

Episodic hypertension, postural fall, pallor, throbbing headache, palpitations and perspiration are suggestive clinical features.[75]

Investigations

- Screening tests include urinary biochemical assay for free catecholamines, metanephrines and vanillyl-mandelic acid (VMA). These tests have high specificity (99%) and sensitivity (85-90%). Following drugs should be withdrawn for 48 hours before doing these tests: alpha methyldopa, penicillin and certain vegetables. Patients can be continued on CCBs and ACE inhibitors during evaluation.
- Tumor localisation: Computed Tomography scan and MRI of the abdomen have greatly simplified tumor localisation; MIBG labelled with I^{131} is the most accurate way of diagnosing adrenal and extra adrenal pheochromocytomas.[76]
- Once localised, surgery should be offered to all the patients. Mortality from surgery is now less than 5%. For pre-operative preparation, control of blood pressure is important and can be achieved with oral phenoxybenzamine 10 mg once daily, to be increased slowly. Oral prazosin and terazosin preferentially block post-synaptic alpha1-receptors on vessel wall and leave pre-synaptic alpha 2- receptors. As a result, tachycardia is less of a problem. Beta-blockers may be given to these patients to control tachycardia and arrhythmias, only after alpha-blockers have been started.

2. Primary Aldosteronism

Primary aldosteronism is due to excess aldosterone secretion by the adrenal cortex secreted generally by adenomas and occasionally due to bilateral adrenocortical hyperplasia. This is suspected in a case of hypertension showing persistent hyokalaemic metabolic alkalosis in the absence of diuretic therapy. It is usually diagnosed by imaging techniques. Treatment is generally surgical removal of the adenoma.

3. Cushing's Syndrome

Hypertension is present in approximately 80% of patients with Cushing's syndrome. Other clinical features include central obesity, hirsutism, polycythaemia and pink striae on the abdomen. Hypertension remits in most patients after successful treatment.

D. Miscellaneous

Other important secondary causes include:

- Oral contraceptives (see Hypertension in Women Pg. no. 33)
- Coarctation of aorta, a congenital disease needs surgical correction
- Thyroid disorders, both hypothyroidism and hyperthyroidism
- Sleep apnea syndrome is one of the common causes of reversible hypertension
- Acute stressful situations cause intense sympathetic discharge and may temporarily induce hypertension
- Common conditions include acute mental stress, hypoglycaemia, acute intermittent porphyria, exposure to cold, burns, perioperative period and post head injury
- Drugs: Non-steroidal anti-inflammatory drugs, sympathomimetic amines, ephedrine, glucocorticoids, cocaine and amphetamines can all cause significant hypertension